

(Bard College, New York)_i

(AT & T, New York)_j

$$\mathbf{p}'_i$$

$$\mathbf{p}'_j$$

Eq. (3)

$$\mathbf{p}_{ij}^{to}$$

\mathbf{C}^{to}

(city, state) $\rightarrow \mathbf{x}_1$

(city, team) $\rightarrow \mathbf{x}_2$

...

Eq. (1)

$$\begin{aligned} L^s(\mathbf{C}^{to}, \mathbf{p}_{ij}^{to}) = & -\log \left(\prod_{k \in \{\text{city, state}\}} \mathbf{p}_{ijk}^{to} \prod_{k \in R - \{\text{city, team}\}} (1 - \mathbf{p}_{ijk}^{to}) \right. \\ & \left. + \prod_{k \in \{\text{city, team}\}} \mathbf{p}_{ijk}^{to} \prod_{k \in R - \{\text{city, team}\}} (1 - \mathbf{p}_{ijk}^{to}) + \dots \right) \end{aligned}$$